



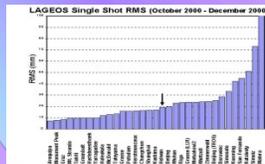
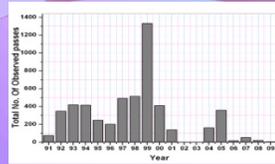
Recent and future operation of Helwan-SLR station



Makram Ibrahim, Kh. I. Khalil, and A. T. Roman
National Research Institute of Astronomy and Geophysics (NRIAG)

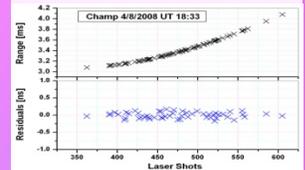
Introduction

- The laser ranging technique is one of the most accurate methods to track the artificial earth's satellites.
- The tracking of the artificial earth satellites from the Helwan observatory has started in the year 1974 at the half Automatic station and in 1982 a full automatic station has constructed for blind observations.
- A lot of modifications and upgrading applied to the Helwan-SLR station in order to improve its performance.
- The main purpose of the paper is to discuss the recent status of the Helwan SLR-station with its new equipments and its observational data.

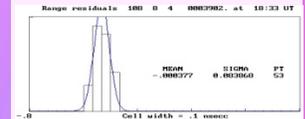


The performance of the Helwan-SLR station and its results relative to other SLR-stations

Results and Discussions



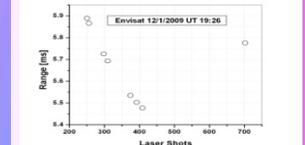
The observed range in ms in the upper part and the residuals in nsec in the lower part for the satellite Champ observed at 2008.



The histogram of the range residuals for the satellite Champ shows RMS of 0.08 nsec.

#	H	M	S	Range(m)	Psec	PT/NPT
1	18	33	56.8003	3.0783	88	1
2	18	34	3.80031	3.12706	31	4
3	18	34	8.8003	3.18531	105	7
4	18	34	12.4003	3.23847	70	7
5	18	34	17.4003	3.32732	109	9
6	18	34	22.0003	3.42527	90	7
7	18	34	28.4003	3.57729	75	9
8	18	34	32.4003	3.68449	105	4
9	18	34	36.0003	3.78745	90	3
10	18	34	41.4003	3.95233	88	1
11	18	34	45.4003	4.08178	88	1

The normal point as computed for the same satellite Champ.



The pass of the satellite Envisat as observed at 2009.

Conclusion

- ❖ Although the precision of the measurements of the Helwan SLR-Station is good, there is a bad performance of the Helwan-SLR station during the previous years.
- ❖ That performance is referred in fact to some reasons, one of them is the old LRE unit which installed at the station 20 years ago.
- ❖ Total number of passes observed during 2007, 2008 and 2009 are, 54, 21 and 6.
- ❖ There is upgrading of new equipment (LRC) of the satellite laser ranging station at Helwan-SLR station. It will be installed to the station during August 2011.
- ❖ The results and the analysis of the data obtained recently using the cpf-formats are given and shows a high precision of the measurements.
- ❖ It is expected to improve the performance of the Helwan SLR-Station in the near Future.

Near Future



The laser radar control system will replace 20 years old system. The new system will increase the reliability of the laser station. In 2009 the laser radar control system was completely redesigned [Dr. Miroslav Cech, private information]. The system is based on powerful 80C188EB microprocessor operating with 1MB memory.

References

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Nd:YAG Laser



Az- El Mount



LRE



Equipments

GPS HP-58503B



Equipments of the Helwan-SLR station

Time Interval Counter SR620